

Appendix E

CHART Assessment for the Hood Canal Summer-run Chum Salmon ESU

CHART Participants

The CHART for this ESU consisted of the following NOAA Fisheries biologists: DeeAnn Kirkpatrick (CHART Leader), Steve Fransen, Tom Hooper, Steve Keller, Mike Parton, and Tim Tynan. Steve Ralph (Environmental Protection Agency) is another Federal biologist who served on this CHART.

The following biologists working for NOAA Fisheries provided valuable expertise to the CHART, but were not part of the deliberations or formal scoring/rating process: Bill Graeber (NOAA Fisheries) and Tom Sibley (NOAA Fisheries). This CHART assessment also benefitted from review and comments by staff from the Point No Point Treaty Council and Washington Department of Fish and Wildlife.

ESU Description

The Hood Canal summer-run chum salmon ESU was listed as a threatened species in 1999 (64 FR 14508; March 25, 1999). The ESU includes all naturally spawned populations of summer-run chum salmon in Hood Canal and its tributaries as well as populations in Olympic Peninsula rivers between Hood Canal and Dungeness Bay, Washington. Hood Canal summer-run chum are the southernmost occurrence of the summer-run life history for the species. The ESU appears to be uniquely adapted to the local habitat conditions, allowing this life-history to persist in what otherwise would be deemed an inhospitable environment. The agency recently conducted a review to update the ESU's status, taking into account new information and considering the net contribution of artificial propagation efforts in the ESU. We recently published the results of this review and concluded that Hood Canal summer-run chum salmon (including eight hatchery programs) should remain listed as threatened (70 FR 37160; June 28, 2005).

The Summer Chum Salmon Conservation Initiative (WDFW and PNPTT 2000) provides a comprehensive overview of this ESU and describes the following life history and habitat requirements. Migration to spawning grounds occurs from late August through late October. Adults generally spawn in low gradient, lower mainstem reaches of natal streams, typically in center channel areas due to the low flows encountered in the late summer and early fall. Eggs incubate in redds for five to six months and fry emerge between January and May. After hatching fry move rapidly downstream to subestuarine habitats. WDFW and PNPTT (2000) noted that successful incubation and rearing

depends on a variety of conditions including: 1) the presence of adequate large woody debris to reduce scour of incubating eggs and moderate peak winter flow velocities, 2) the absence of excessive fines within spawning gravel, 3) stable channel configuration, and 4) access to floodplain and off-channel areas.

Subestuary deltas support a diverse array of habitats (tidal channels, mudflats, marshes, and eelgrass meadows) that provide essential rearing and transition environments for this ESU. Juveniles rear in these habitats for days to weeks before entering the ocean, and returning adults stage in subestuaries before ascending natal streams to spawn. Juveniles feed primarily on plankton and epibenthic organisms, while subadults feed on similar items as well as larger prey (including fishes and squid). Most adults mature and spawn as 3- and 4-year old fish (WDFW and PNPTT 2000).

Recovery Planning Status

Sixteen historical demographically independent populations of Hood Canal summer-run chum have been identified for this ESU: eight extant populations (the Union River, Lilliwaup Creek, Hamma Hamma River, Duckabush River, Dosewallips River, Big/Little Quilcene River, Snow and Salmon creeks, Jimmycomelately Creek populations), and eight extirpated or possibly extirpated populations (the Dungeness River, Big Beef Creek, Anderson Creek, Dewatto Creek, Tahuya River, Skokomish River, Finch Creek, and Chimacum Creek populations) (WDFW and Point No Point Treaty Tribes 2000). The Puget Sound TRT has identified 5 “geographic regions of diversity and correlated risk” in Puget Sound (Ruckelshaus et al. 2002). The regions are based on similarities in hydrographic, biogeographic, geologic, and catastrophic risk characteristics and where groups of populations have evolved in common (Ruckelshaus et al. 2002). The Hood Canal summer-run chum salmon ESU occupies two of these regions – the Strait of Juan de Fuca and Hood Canal. Recovery planning will likely emphasize the need for a geographical distribution of viable populations across the range of such regions in an ESU (Ruckelshaus et al. 2002, McElhany et al. 2003). Local recovery planners completed the Hood Canal and Strait of Juan de Fuca Summer Chum Recovery plan in late June of 2005. The CHART considered the available TRT products and a previously completed local recovery plan (WDFW and Point No Point Treaty Tribes 2000) in rating each watershed, but did not have the benefit of the more recent local recovery plan. We anticipate that, as recovery planning proceeds, we will have better information and may revise our recommendations regarding critical habitat designations.

CHART Area Assessments

The CHART assessment for this ESU addressed four subbasins containing 12 occupied watersheds. Therefore, as part of its assessment the CHART considered the conservation value of each HUC5 in the context of the populations within these two geographic regions. The CHART noted several streams for which WDFW's information on summer chum salmon presence appeared to be inconsistent with their own knowledge of these watersheds, as well as presence described in the Summer Chum Salmon Conservation Initiative (WDFW and PNPTT 2000). In particular, questions were raised with WDFW (B. McTeague, WDFW, personal communication) about the ESU's presence in Jorsted, Stavis, Seabeck, Big Anderson, and Mission creeks. Of these, only presence in Mission Creek was reconciled and removed from occupied status. (WDFW 2003) and the others are still being considered for inclusion/exclusion by WDFW. Information is presented below by USGS subbasin because they present a convenient and systematic way to organize the CHART's watershed assessments for this ESU and their names are generally more recognizable because they typically identify major river systems.

Skokomish Subbasin (HUC4# 17110017)

The Skokomish subbasin is located at the southern end of Hood Canal, and most of it is in Mason County, Washington (although small portions of the subbasin – unoccupied by this ESU – also extend into Grays Harbor and Jefferson counties, Washington). The subbasin contains a single watershed (Skokomish River HUC5# - 1711001701) and encompasses approximately 245 mi² and 951 miles of streams. The Skokomish River population is the only historic population documented in this subbasin/watershed (WDFW and PNPTT 2000)). Fish distribution and habitat use data from WDFW identify approximately 13 miles of occupied riverine/estuarine habitat in the subbasin/watershed (WDFW and PNPTT 2000)). The CHART concluded that all of these occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. The CHART noted that this watershed contains the largest intact estuary in Hood Canal. Table E1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watershed(s). Map E1 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

Hood Canal Subbasin (HUC4# 17110018)

The Hood Canal subbasin includes most of the drainages of Hood Canal proper, including those of the western Kitsap Peninsula. The subbasin includes portions of the following Washington counties: Clallam, Jefferson, Kitsap, and Mason. The subbasin contains 7 of the 12 watersheds occupied by this ESU and encompasses approximately

715 mi² and 3,041 miles of streams. WDFW and PNPTT (2000) identified the following historic populations in this subbasin: Lilliwaup Creek, Hamma Hamma River, Duckabush River, Dosewallips River, Big/Little Quilcene River, Big Beef Creek, Anderson Creek, Dewatto Creek, Tahuya River, and Finch Creek. Fish distribution and habitat use data from WDFW identify approximately 48 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003). Occupied reaches in two HUC5s (Dosewallips River and Duckabush River) overlap with FEMAT key watersheds for at-risk anadromous salmonids (FEMAT 1994). The CHART concluded that all of these occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table E1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watershed(s). Map E2 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

The CHART identified two streams (Finch Creek and Anderson Creek) and portions of Chimacum Creek that are unoccupied but essential for the conservation of the ESU. These streams historically supported independent populations of summer-run chum salmon (WDFW and PNPTT 2000) and are considered important areas for ESU expansion during recovery (NMFS 2003). The CHART believed that these areas are essential for conservation because they historically supported summer-run chum populations, are still accessible to summer-run chum, are adjacent to other occupied streams that may facilitate recolonization, and - due to the limited number of areas occupied by this ESU - contain habitat that is likely to be important for conservation as the ESU expands (in number of spawners and range) during recovery. The CHART recognized that WDFW and PNPTT did not rate these high due to limited habitat availability and production potential.

Kitsap Subbasin (HUC4# 17110019)

The Kitsap subbasin includes drainages at the northern entrance to Hood Canal. The portion of the subbasin inhabited by this ESU is wholly within Jefferson County, Washington. The subbasin contains a single occupied watershed (Port Ludlow/Chimacum Creek HUC5# - 1711001908) that encompasses approximately 82 mi² and 212 miles of streams. The Chimacum Creek population is the only historic population documented in this subbasin/watershed (WDFW and PNPTT 2000). Fish distribution and habitat use data from WDFW identify slightly more than 1 mile of occupied riverine/estuarine habitat in the watershed (WDFW 2003). The CHART concluded that all of these occupied areas contained one or more PCEs for this ESU and

identified management activities that may affect the PCEs. Table E1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watershed(s). Map E3 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

The CHART also concluded that PCEs in this subbasin warrant a high rating for conservation value to the ESU (NOAA 2003). The CHART identified an additional 5-mile stream segment in Chimacum Creek that is currently unoccupied but essential for the conservation of the ESU. This stream segment historically supported the Chimacum Creek population of summer-run chum salmon (WDFW and PNPTT 2000) and, due to the limited number of areas occupied by this ESU, is likely to be an important area for ESU expansion during recovery (NMFS 2003).

Dungeness-Elwha Subbasin (HUC4# 17110020)

The Dungeness/Elwha subbasin includes drainages to the eastern Strait of Juan de Fuca and includes portions of Clallam and Jefferson counties, Washington. The subbasin contains three occupied watersheds and encompasses approximately 350 mi² and 1,233 miles of streams. WDFW and PNPTT (2000) identified the following historic populations in this subbasin: Dungeness River, Jimmycomelately Creek, and Snow/Salmon creeks. Fish distribution and habitat use data from WDFW identify approximately 19 miles of occupied riverine/estuarine habitat in the watersheds (WDFW 2003). The CHART concluded that all of these occupied areas contained one or more PCEs for this ESU and identified management activities that may affect the PCEs. Table E1 summarizes the total number of occupied riverine and estuarine reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watershed(s). Map E4 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

CHART Conservation Value Rating

Freshwater Areas

After reviewing the best available scientific data regarding critical habitat for this ESU, the CHART concluded that all of the 12 occupied HUC 5 watersheds were either of high or medium conservation value to the ESU. None of the watersheds was considered to be of low conservation value, primarily because approximately half of the historical populations in this ESU have been extirpated, and the remaining populations occupy a

very limited number of stream miles (approximately 60 miles total). The CHART also concluded that all of the occupied areas supported populations necessary to the conservation of the ESU. Table E2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure E1 shows the overall distribution of ratings by HUC5 watershed. The CHART concluded that it was important to have high value watersheds identified in each of the two TRT geographic regions (Hood Canal and Strait of Juan de Fuca) and their assessment reflects that conclusion. The CHART benefited from the considerable information contained in the Summer Chum Salmon Conservation Initiative (WDFW and PNPTT 2000) and that document's emphasis on particular stocks/areas for conservation. Some of these emphases are noted in Table E2 as they related to CHART assessments of conservation value for each HUC5.

Marine Areas

In addition to the freshwater and estuarine areas described above, the CHART also evaluated five nearshore marine areas for this ESU (see Map E5). The nearshore marine area considered by the Team includes that zone from extreme high water out to a depth of 30 m and adjacent to watersheds occupied by the ESU. The Team assessment focused on this area because it generally encompasses photic zone habitats supporting plant cover (e.g., eelgrass and kelp) important for rearing, migrating, and maturing chum salmon and their prey. Also, PCEs that may require special management considerations or protection are more readily identified in this zone (e.g., destruction of vegetative cover due to docks and bulkheads). Deeper waters are occupied by subadult and maturing fish, but it is unclear if these areas contain PCEs that require special management considerations or protection. The Team concluded that all nearshore habitat areas from the southern terminus of Hood Canal northeast to Dungeness Bay in the Strait of Juan de Fuca warrant a high conservation value to the ESU. These habitat areas are found along approximately 402 miles of shoreline within the range of this ESU.

Changes to the CHART's Initial Assessments

The CHART reviewed the public and peer reviewer comments received on the Team's initial findings for this ESU as well as new information relevant to evaluating habitat areas for this ESU. As a result, the CHART did not change conservation value ratings for any watershed or nearshore zone within the geographical area occupied by this ESU, and there were no changes to the delineation of occupied habitat areas. The proposed critical habitat designation (69 FR 74572, December 14, 2004) summarizes the comments and responses pertaining to the CHART's initial determinations for this ESU, and Tables E1 and E2 reflect the final CHART assessments.

References and Sources of Information

References cited above as well as key reports and data sets reviewed by the CHART include the following:

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Table E1. Summary of Occupied Areas, PCEs, and Management Activities Affecting PCEs for the Hood Canal Summer-run Chum Salmon ESU

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs)				Unoccupied and essential for conservation (mi)**	Management Activities***
				Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*	Estuarine and Nearshore Marine Shoreline (mi)		
	Skokomish	Skokomish River	1711001701	6.1	<0.1	6.9 ^w	0		C, D, F, U
	Hood Canal	Lower West Hood Canal Frontal	1711001802	1.4	0	1.3	0	1	C, F, R, U
	Hood Canal	Hamma Hamma River	1711001803	2.7	<0.1	<0.1	0		C, F, U
	Hood Canal	Duckabush River	1711001804	2.3	0	0	0		C, F, U
	Hood Canal	Dosewallips River	1711001805	3.3	0.1	0	0		C, F, R, U
	Hood Canal	Big Quilcene River	1711001806	2.4	0.4	<0.1	0		C, F, U
	Hood Canal	Upper West Hood Canal Frontal	1711001807	1.4	0.2	0	0		C, F, U
	Hood Canal	West Kitsap	1711001808	8.2	<0.1	23.8	0	1.7	A, F, U
	Kitsap	Port Ludlow/ Chimacum Creek	1711001908	1.1	0	0	0	5	A, B, F, U
	Dungeness/ Elwha	Discovery Bay	1711002001	3.7	0	0.4	0		A, C, F
	Dungeness/ Elwha	Sequim Bay	1711002002	0.8	<0.1	0	0		C, F, U
	Dungeness/ Elwha	Dungeness River	1711002003	3.2	0	10.7	0		C, F, R, S, U
		Nearshore Marine Area	N15	0	0	0	101.8		C, H, T, U
		Nearshore Marine Area	N16	0	0	0	16.3		C, H
		Nearshore Marine Area	N17	0	0	0	45.1		C, H, S
		Nearshore Marine Area	N18	0	0	0	213.5		C, H, T
		Nearshore Marine Area	N19	0	0	0	25		C, H

* Some streams classified as “Migration/Presence PCEs” may also include rearing or spawning PCEs, but the GIS data are still undergoing review to confirm additional habitat use types.

** These habitat areas are currently unoccupied. However, the CHART determined that these areas are essential for conservation of the ESU.

*** This list is not exhaustive. It is intended to highlight key management activities affecting PCEs in each watershed. Activities identified are based on the general categories described by Spence et al. (1996) and summarized previously in the “Special Management Considerations or Protection” section of this report. Coding is as follows: F= forestry, G = grazing, A = agriculture, C = channel modifications/diking, R = road building/maintenance, U = urbanization, S = sand and gravel mining, M = mineral mining, D = hydroelectric dams, I = irrigation impoundments and withdrawals, T = river, estuary, and ocean traffic, W = wetland loss/removal, B = beaver removal, X = exotic/invasive species introductions, H

^w A small portion of these PCEs in the lower Skokomish River overlap with estuarine and nearshore marine PCEs within Nearshore Marine Area N17.

= forage fish/species harvest. Primary sources for this information were the CHART and reports by Ames (2000), Haring (2000), Washington State Department of Natural Resources (2001), Correa (2003), Kuttel (2003), and Fresh et al. (2004).

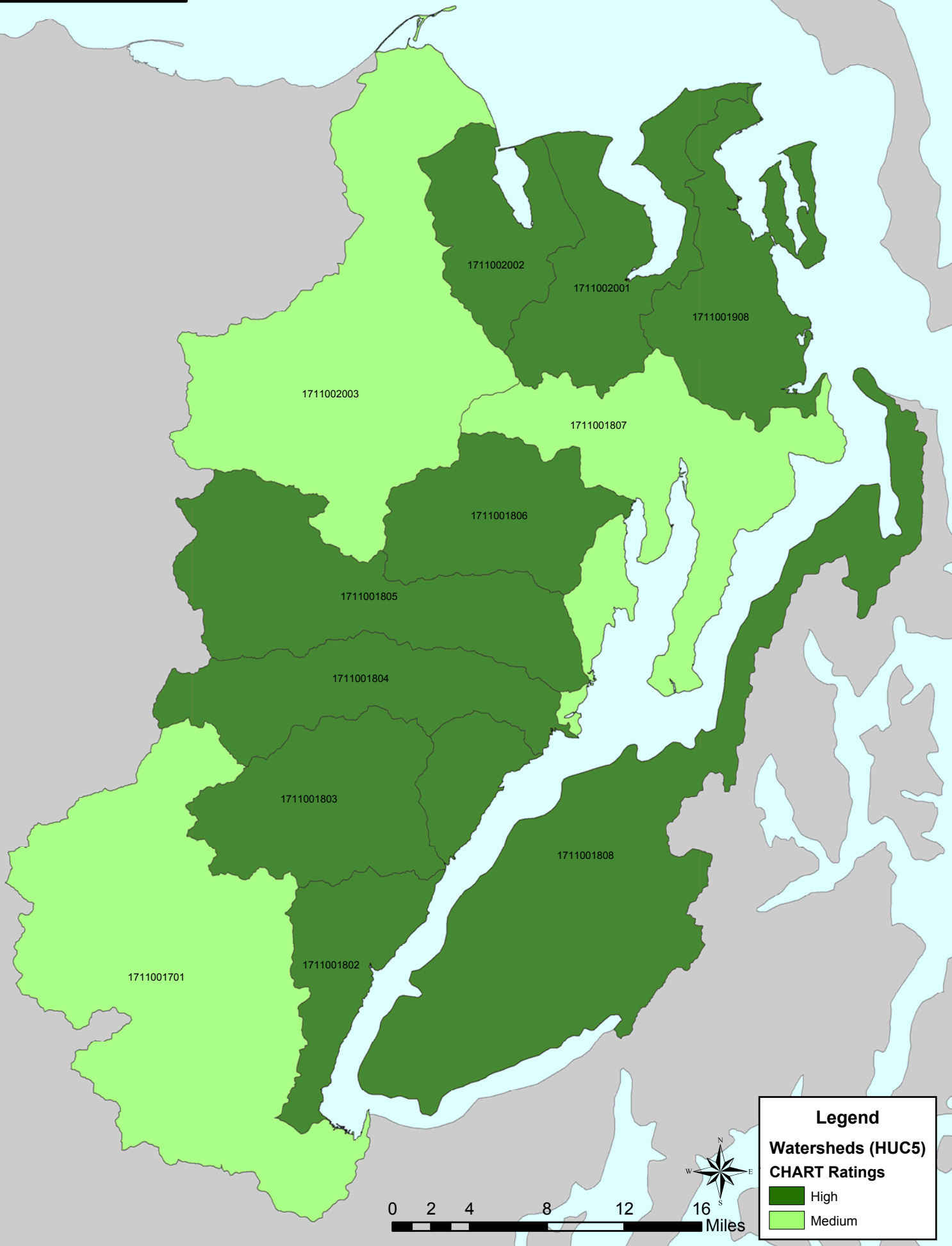
Table E2. Summary of Initial CHART Scores and Ratings of Conservation Value for Habitat Areas in HUC5 Watersheds Occupied by the Hood Canal Summer-run Chum Salmon ESU

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Skokomish	Skokomish River	1711001701	1	0	1	3	2	3	10	High HUC5 score but PCEs severely degraded, probably poorest of all HUC5s	Medium
	Hood Canal	Lower West Hood Canal Frontal	1711001802	2	2	1	3	1	3	12	High HUC5 score; genetic data indicate that Lilliwaup fish contain very unique alleles	High
	Hood Canal	Hamma Hamma River	1711001803	2	2	2	1	2	3	12	High HUC5 score; area recommended for supplementation; high potential production	High
	Hood Canal	Duckabush River	1711001804	1	1	2	1	2	3	10	High HUC5 score; population considered at low risk of extinction with high potential production; PCEs in FEMAT key watershed	High
	Hood Canal	Dosewallips River	1711001805	2	2	2	1	2	3	12	High HUC5 score; population considered at low risk of extinction with high potential production; PCEs in FEMAT key watershed	High
	Hood Canal	Big Quilcene River	1711001806	2	1	2	1	3	3	12	High HUC5 score; ongoing supplementation efforts	High
	Hood Canal	Upper West Hood Canal Frontal	1711001807	1	1	2	1	1	3	9	Moderate HUC5 score; limited distribution and small population size relative to other HUC5s in Hood Canal	Medium
	Hood Canal	West Kitsap	1711001808	3	1	1	3	2	3	13	High HUC5 score; approximately 1/3 of ESU distribution is in this HUC5; may be healthiest of runs in ESU	High
	Kitsap	Port Ludlow/Chimacum Creek	1711001908	1	1	1	1	1	3	8	Moderate HUC5 score but ongoing reintroduction efforts underscore area's importance	High
	Dungeness/Elwha	Discovery Bay	1711002001	2	1	2	2	2	3	12	High HUC5 score; one of only four occupied HUC5s supporting Strait of Juan de Fuca populations	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Dungeness/Elwha	Sequim Bay	1711002002	1	1	2	3	1	3	11	High HUC5 score; one of only four occupied HUC5s supporting Strait of Juan de Fuca populations	High
	Dungeness/Elwha	Dungeness River	1711002003	1	1	2	1	0	3	8	Relatively low HUC5 score for the Strait of Juan de Fuca region; uncertain whether area will be emphasized for recovery activities	Medium
	NA	Nearshore Marine Area	N15							NS	Area not scored since the CHART concluded that estuarine and marine PCEs throughout this nearshore marine area are highly essential to ESU conservation.	High
	NA	Nearshore Marine Area	N16							NS	Area not scored since the CHART concluded that estuarine and marine PCEs throughout this nearshore marine area are highly essential to ESU conservation.	High
	NA	Nearshore Marine Area	N17							NS	Area not scored since the CHART concluded that estuarine and marine PCEs throughout this nearshore marine area are highly essential to ESU conservation.	High
	NA	Nearshore Marine Area	N18							NS	Area not scored since the CHART concluded that estuarine and marine PCEs throughout this nearshore marine area are highly essential to ESU conservation.	High
	NA	Nearshore Marine Area	N19							NS	Area not scored since the CHART concluded that estuarine and marine PCEs throughout this nearshore marine area are highly essential to ESU conservation.	High

Figure E1. CHART Ratings of Conservation Value for Habitat Areas in HUC5 Watersheds Occupied by the Hood Canal Summer-run Chum Salmon ESU

Hood Canal Summer Chum
CHART Watershed Ratings

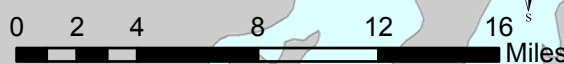


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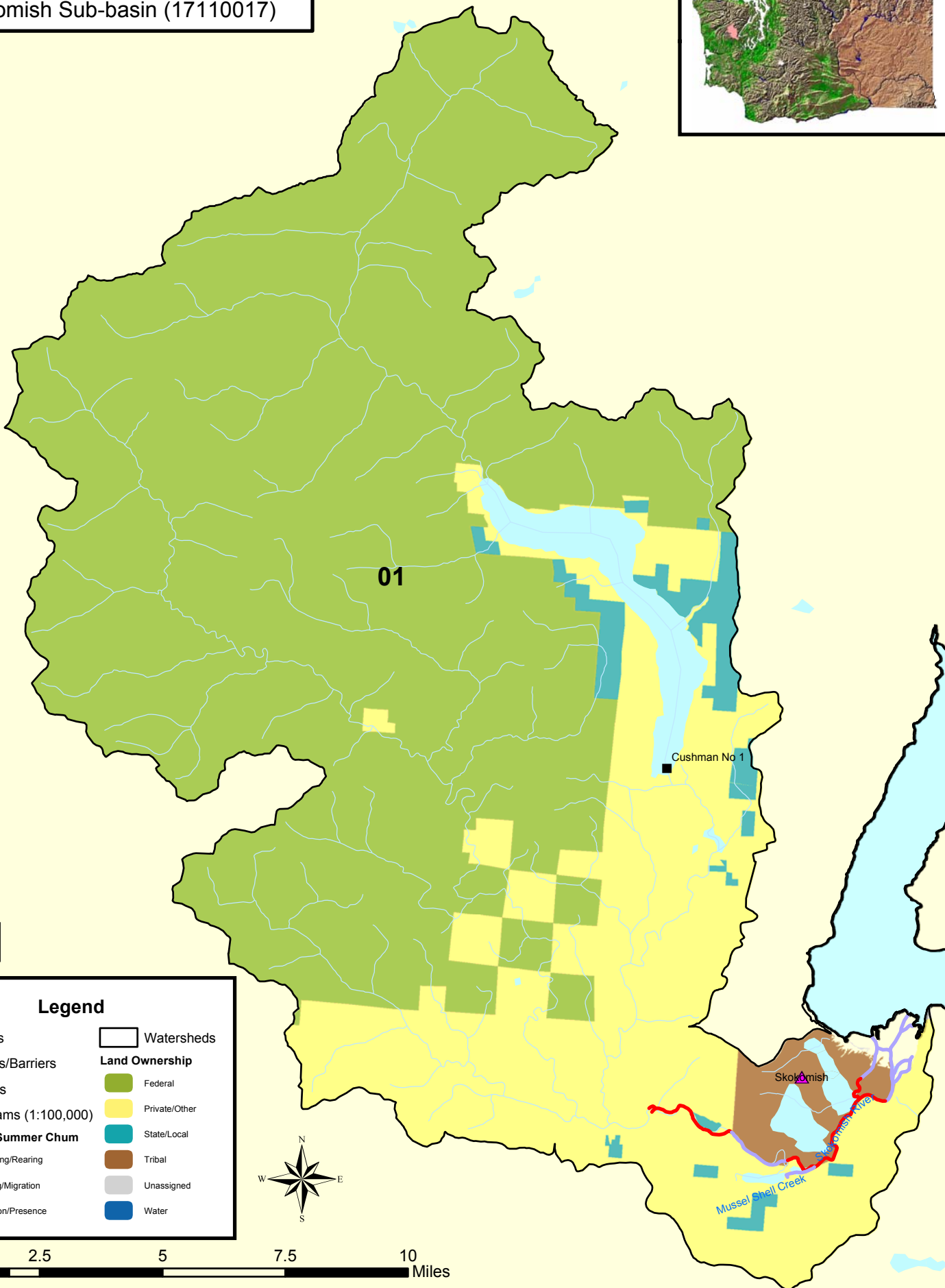
Watersheds (HUC5)

CHART Ratings

- High
- Medium



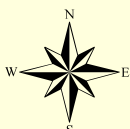
Hood Canal Summer Chum Distribution Skokomish Sub-basin (17110017)



Map E1

Legend

- ▲ Cities
- Dams/Barriers
- Lakes
- Streams (1:100,000)
- Hood Canal Summer Chum**
 - Spawning/Rearing
 - Rearing/Migration
 - Migration/Presence
- Watersheds
- Land Ownership**
 - Federal
 - Private/Other
 - State/Local
 - Tribal
 - Unassigned
 - Water

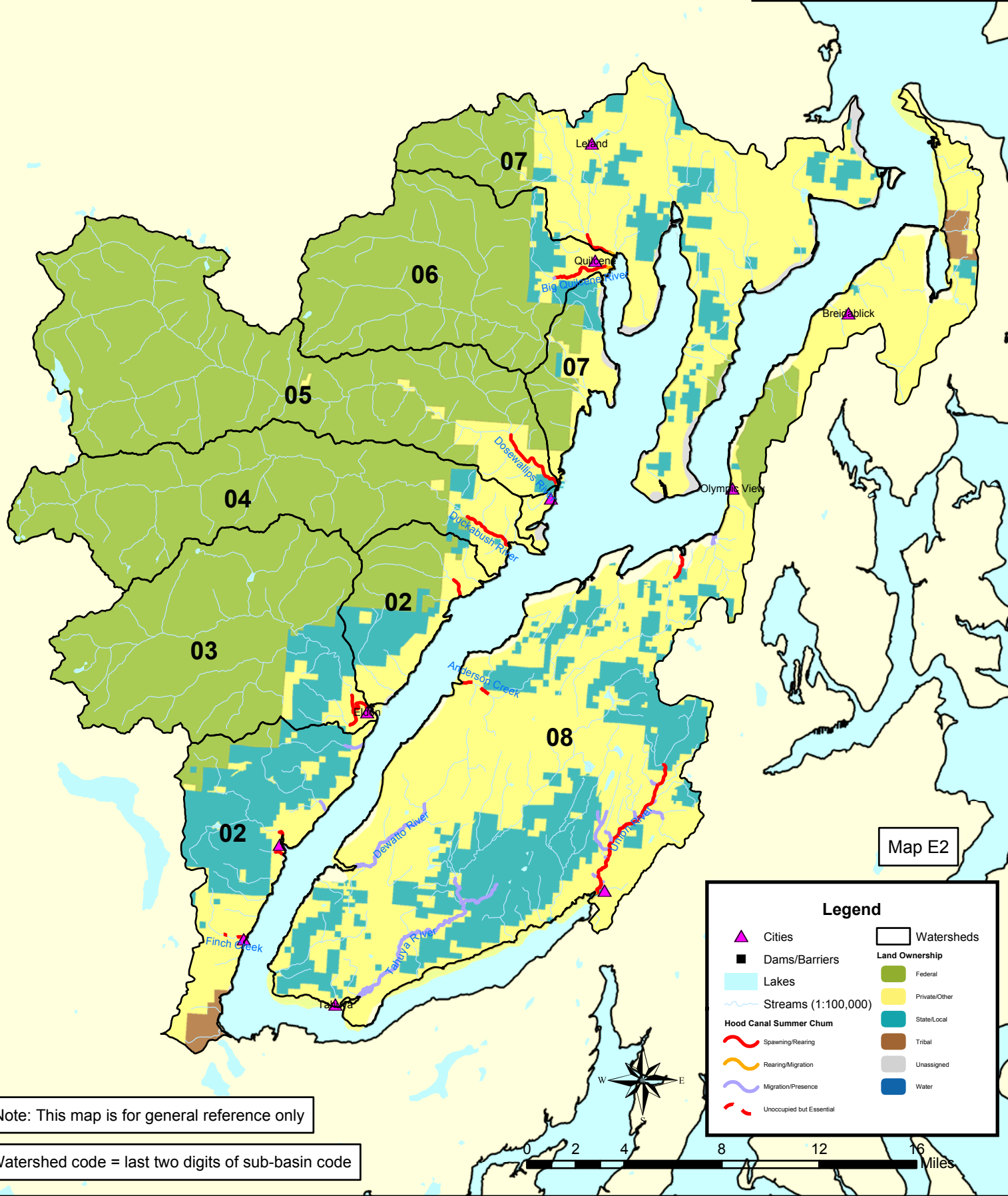


0 1.25 2.5 5 7.5 10 Miles

Note: This map is for general reference only

Watershed code = last two digits of sub-basin code

Hood Canal Summer Chum Distribution
Hood Canal Sub-Basin (17110018)



Map E2

Legend

▲ Cities

■ Dams/Barriers

■ Lakes

— Streams (1:100,000)

Hood Canal Summer Chum

— Spawning/Rearing

— Rearing/Migration

— Migration/Presence

--- Unoccupied but Essential

□ Watersheds

Land Ownership

■ Federal

■ Private/Other

■ State/Local

■ Tribal

■ Unassigned

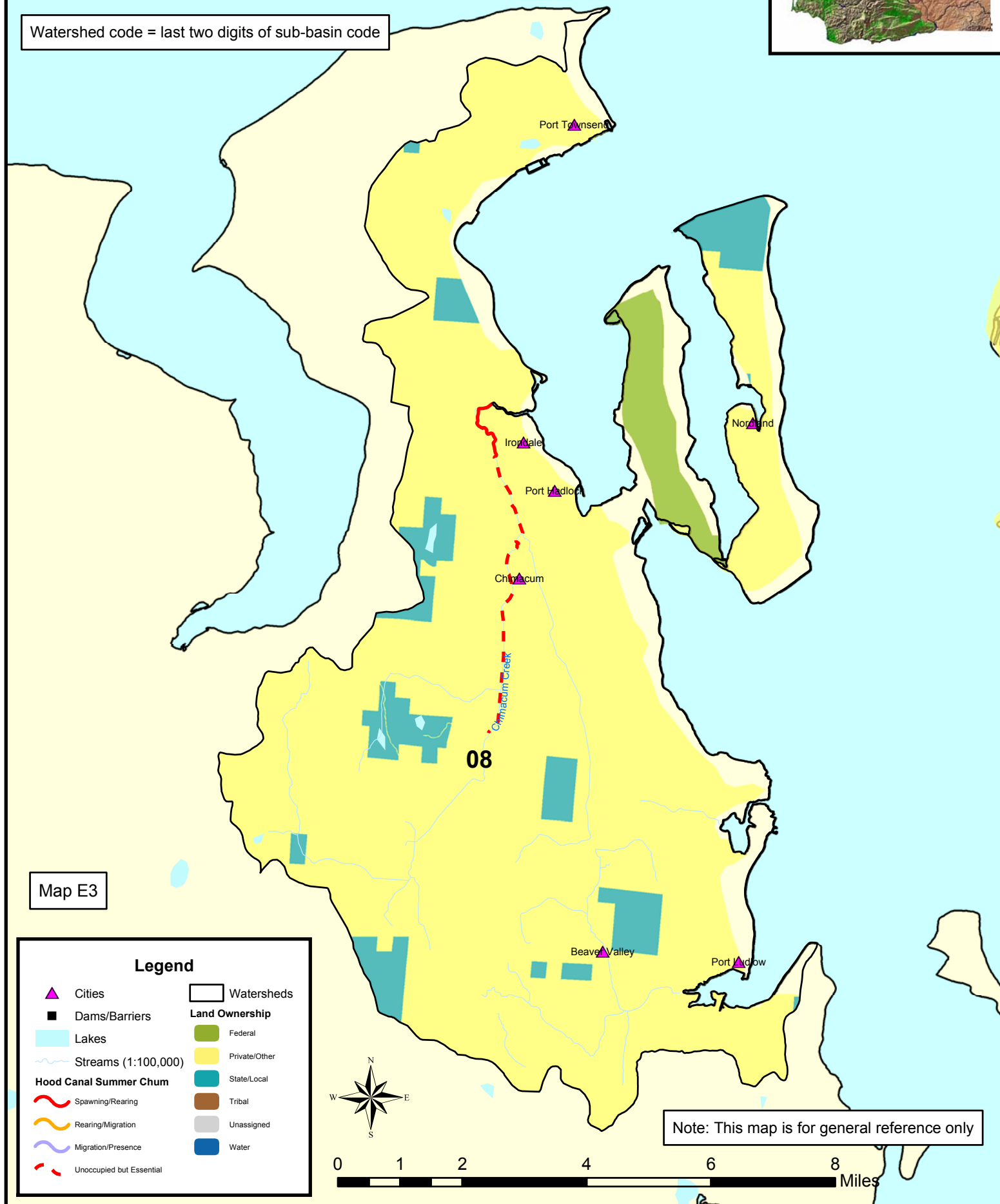
■ Water

Note: This map is for general reference only

Watershed code = last two digits of sub-basin code

Hood Canal Summer Chum Distribution Kitsap Sub-basin (17110019)

Watershed code = last two digits of sub-basin code



Map E3

Legend

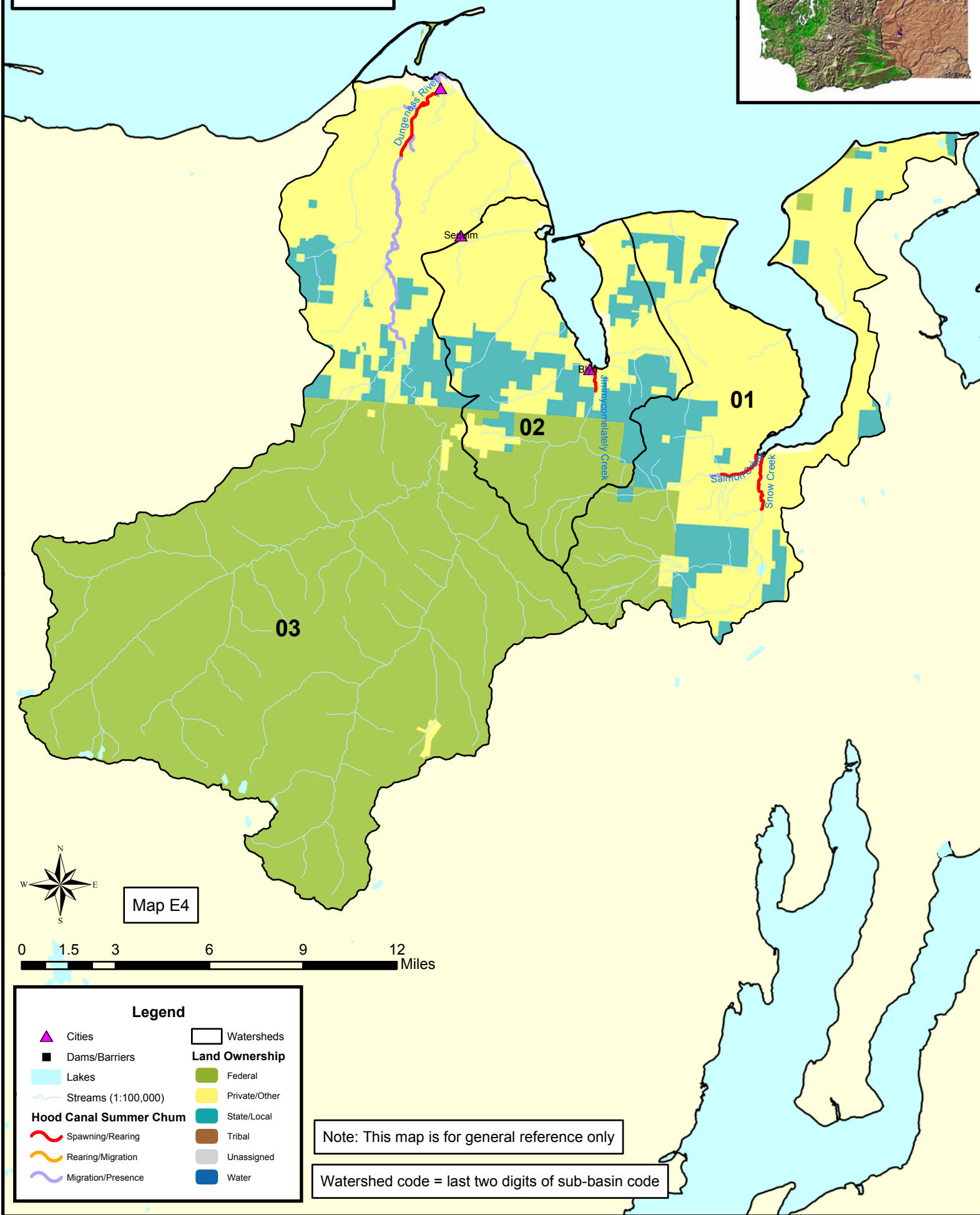
- | | |
|-------------------------------|-----------------------|
| Cities | Watersheds |
| Dams/Barriers | Land Ownership |
| Lakes | Federal |
| Streams (1:100,000) | Private/Other |
| Hood Canal Summer Chum | State/Local |
| Spawning/Rearing | Tribal |
| Rearing/Migration | Unassigned |
| Migration/Presence | Water |
| Unoccupied but Essential | |

Note: This map is for general reference only



0 1 2 4 6 8 Miles

Hood Canal Summer Chum Distribution Dungeness/Elwha Sub-basin (17110020)



Map E4



0 1.5 3 6 9 12 Miles

Legend

- Cities
- Dams/Barriers
- Lakes
- Streams (1:100,000)
- Hood Canal Summer Chum**
 - Spawning/Rearing
 - Rearing/Migration
 - Migration/Presence

Land Ownership

- Federal
- Private/Other
- State/Local
- Tribal
- Unassigned
- Water

Watersheds

Note: This map is for general reference only

Watershed code = last two digits of sub-basin code